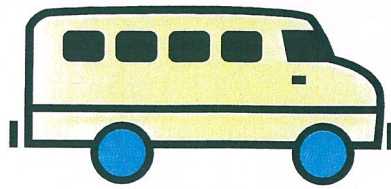
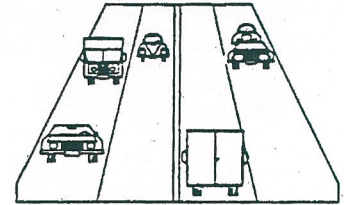


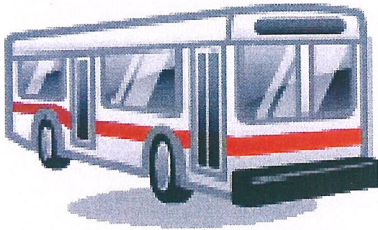
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NNMC Shuttle



LOS "B"



MetroBus

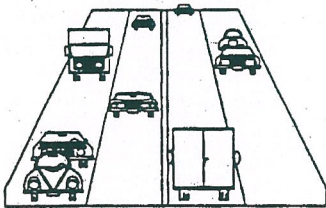
NIH COMMUNITY LIAISON COUNCIL REPORT

Regional Comparison of Medical Facility Staff & Patient Locations with Transit Resource Locations

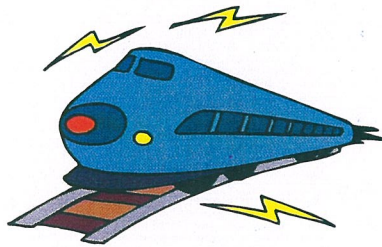
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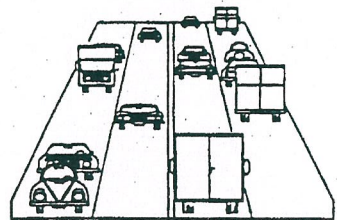
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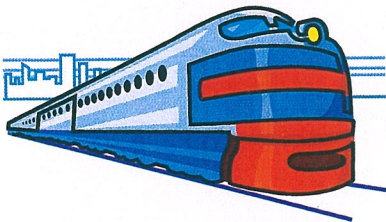
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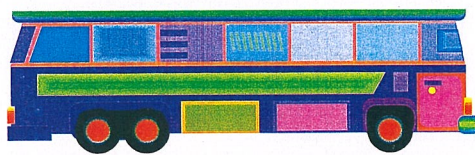
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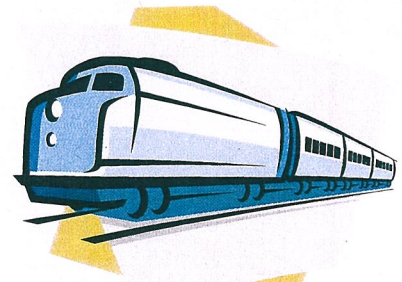
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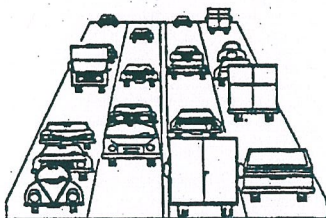
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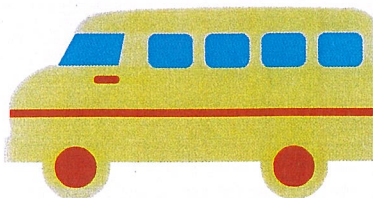
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Howard County Transit



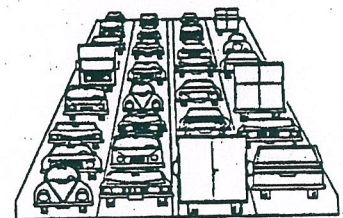
VRE



LOS "E"



NIH Shuttle



LOS "F"

NIH COMMUNITY LIAISON COUNCIL INFORMATION REPORTS

[This is the 7th in a series of BRAC information reports prepared for the NIH Community Liaison Council (CLC), all of whose members live near the NIH main campus and the National Naval Medical Center (NNMC) directly across Wisconsin Avenue from NIH. NNMC and a new hospital at Ft. Belvoir (FBCH) are scheduled to receive additional staff, patients and associated traffic impacts when Walter Reed Army Medical Center (WRAMC) closes in September 2011. CLC information reports are intended to develop and document relevant information to facilitate NIH staff and surrounding neighborhood understanding of such impacts.]

With respect to Bethesda BRAC, previously reported information researched and presented to the CLC by NIH's Office of Community Liaison (OCL) has included summary and analysis of the Draft (12/2007) and Final (3/2008) Environmental Impact Statement (EIS) and the resulting Record of Decision (5/2008) for NNMC expansion, NNMC's revised Master Plan (11/2008), and NNMC's Transportation Management Plan (11/2008).

During the first half of 2009, two additional BRAC-related issues were researched and presented in response to continuing CLC interest in Bethesda BRAC impacts and mitigations:

- (1) The locations and timing of numerous local projects and other changes with potential traffic impacts on Bethesda's 3 vital medical facilities (NNMC, NIH and Suburban Hospital) and
- (2) A comparison between revised agency estimates of needed traffic mitigation resources (~\$120M to 160M) and the amounts currently allocated by the state of MD, provided by Congressional earmark, or requested by various agencies or elected officials (~\$40M to 200M).

During 3Q 2009, with ~2 years left to prepare for post-BRAC transportation demand, more information about various transit initiatives has been published, all related to improved access to MetroRail's Medical Center station and increased transit use by military medical staff, outpatients and other visitors. These initiatives have included:

- (1) WMATA studies of a pedestrian overpass or tunnel across MD355 and/or new elevators to access Medical Center station from the NNMC (east) side of MD355;
- (2) County and MWCOG proposals for a driveway underneath MD355 connecting NIH and NNMC for pedestrian, bike, shuttle and emergency vehicle traffic;
- (3) OEA-funded County study of pedestrian and bike trail adequacy and upgrade possibilities in the area surrounding Bethesda's medical facilities;
- (4) NNMC plans for expanded shuttle service between the base and the transit services area on NIH property across the street from NNMC; and
- (5) Commuter education, incentives and promotion of transit to NNMC staff.

The above-mentioned initiatives triggered CLC interest in an independent evaluation of how effective a mitigation increased transit use could be from a regional (rather than local or individual agency) perspective. A regional perspective has not generally been apparent in the numerous studies, publications, presentations and meetings on Bethesda BRAC transportation issues undertaken to date.

OCL information reports don't speak for either the NIH community or the 15 surrounding community associations represented on the CLC. Once local community members express interest in relevant information about NIH and adjacent area impacts and mitigations, OCL research and documentation resources are applied to characterize and disseminate that information. This is the basic purpose of CLC information reports, which typically reference numerous public sources for anyone seeking further detail. Whether and how CLC information reports might be referred to or used by community members and other interested parties is beyond their purpose and not OCL's concern.

Most of OCL's BRAC information reports have taken the form of CLC meeting presentations and slide handouts. This report however, covers a wide enough area (MD, DC and VA) and includes enough graphical information, references and assumptions to warrant further explanation in a written narrative.

TRANSIT FOCUS OF THIS REPORT

[Near term mitigation of Bethesda BRAC traffic congestion impacts depends largely on increased transit use by military medical staff, outpatients and other visitors.]

Among Bethesda BRAC's issues of interest to the NIH and surrounding community is the effectiveness with which transit resources can reasonably be expected to mitigate local traffic impacts. The Bethesda BRAC mitigations documented to date include (1) local intersection improvements, (2) improved Metro station access, (3) bike and pedestrian infrastructure upgrades, and (4) increased transit use.

More use of transit resources by military medical staff, outpatients and other visitors has been prominent among the above mitigations. That prominence reflects:

- (1) Opportunities to increase relatively low transit use by current military medical staff and outpatients (e.g. ~11% for NNMC staff; ~4% for WRAMC staff; and likely less than 5% for outpatients and other visitors [2, 15, 16, 22]) and
- (2) Remaining uncertainty with respect to the time and funding available to implement the other mitigations mentioned above (intersections, Metro station access, hiker/biker trails), all of which require infrastructure expansion. (Funding uncertainty has gradually decreased over time as a result of continuing efforts by agency staff and elected officials, such as the House of Representatives recently recommending supplemental funding of WRNMMC and FBCH transportation improvements. [35])

Since the conditions for increased transit use include cultural and individual behavior as well as infrastructure and service elements, considerable uncertainty remains as to how much and how quickly transit use will actually increase. The good news is that, compared to those mitigations which rely on infrastructure expansion, increased transit use seems least affected by physical and funding constraints, environmental studies, agency reviews, public interaction, and the process duration and complexity associated with construction projects in an already built-out area with existing highway Levels of Service (LoS) "E" and "F" (the most congested, as illustrated on the cover of this report).

Therefore, except for a temporary (i.e. until infrastructure expansion projects are complete) civil police presence during peak commute hours on MD355 and Jones Bridge Road, increased transit use could be the Bethesda BRAC traffic mitigation with the best chance of being at least partly in place by or within a year after September 2011.

Figure 1 shows the current distribution of the Capital Area's 2 military medical centers and 35 clinics. By September 2011, WRAMC is scheduled to close and full scale operation of Bethesda's expanded NNMC (to be renamed Walter Reed National Military Medical Center , WRNMMC) and the new Ft. Belvoir Community Hospital (FBCH) is scheduled to begin. In other words, by September 2011, one center (WRAMC) will close; another (NNMC) will have been expanded to create WRNMMC; and a new center (FBCH) will have been built to replace the 1950s era Dewitt Army Hospital at Ft. Belvoir.

REGIONAL PERSPECTIVE OF THIS REPORT

[A regional perspective of transit is warranted in view of the wide area to be served by the two regional military medical centers remaining after WRAMC closes in September 2011.]

This report integrates and presents in a consistent graphical manner the available information from multiple agencies on an issue particularly relevant to increased transit use by military medical staff, outpatients and other visitors. From a regional perspective, it compares the locations of existing transit resources to the residence locations of current NNMC and WRAMC staff and outpatients. This comparison is relevant to the effectiveness of BRAC traffic mitigation because the more convenient, reliable and cost effective transit resources are, the more likely it is that military medical staff, outpatients and other visitors will increase their use of transit. [24]

A regional (rather than local or agency) perspective is warranted both geographically and facility-wise because:

- (1) The two regional military medical facilities planned to absorb Walter Reed operations (WRNMMC and FBCH) are by road, ~34 miles apart, which means that an area covered by numerous and largely independent federal, state and local jurisdictions is involved;
- (2) The medical staff and patients of the future WRNMMC and FBCH are distributed across an even broader area (~5000 square miles), which is centered on DC and now served by at least 10 different rail and bus transit systems;
- (3) A significant fraction (estimated based on subsequent figures to be at least 30%) of current WRAMC and NNMCM patients live physically closer to FBCH than WRNMMC; and
- (4) Both WRNMMC and FBCH are planned to be "world class" medical facilities. [21] (For example, NNMCM's designation as "The President's Hospital" has been well known for many years, and the new FBCH will be state-of-the-art (e.g. 1.3 Mft² of clinic and inpatient medical facilities; ~3000 medical staff members, numerous on site and on-base amenities; parking for ~4000 cars; and a choice of rail and bus services for those using transit).

Based on NNMCM's Transportation Management Plan [2], current NNMCM and WRAMC staff transit use (rail + bus) is respectively 11% and 4 %. Current transit use has not been reported for outpatients, inpatient visitors, shoppers, volunteers or other visitors, but it's highly unlikely to exceed staff transit use. This means that more than 90% of visitors now drive to NNMCM and WRAMC.

Based on NNMCM's Transportation Management Plan, WRNMMC's goal is to nearly triple staff transit use from 11% to 30%. Moreover, WMATA anticipates an 80% increase in transit use by WRNMMC visitors. [22] Therefore, the effectiveness of planned BRAC traffic mitigation significantly depends on whether both staff and visitors increase their use of transit as much as EIS and derivative forecasts indicate. Based on the 4 factors listed above, the level of transit use ultimately achieved is likely to reflect both regional and locally motivated choices by staff, outpatients and other visitors.

TRANSIT RESOURCES

[WRNMMC and FBCH are served by at least 3 rail systems and 7 bus systems.]

The regional transit resources considered here cover the large (~5000 sq. mile) area to be served by the two regional military medical centers remaining after WRAMC closure. As noted above, these regional centers will be located at Bethesda (WRNMMC in Montgomery County, MD) and Ft. Belvoir (FBCH in Fairfax County, VA).

The regional transit resources serving WRNMMC and/or FBCH include 3 rail systems and 7 bus systems. The rail systems are MetroRail, MARC (MD Rail Commuting system), and VRE (VA Railway Express). The bus systems are MetroBus (WMATA regional bus services in DC, MD and VA), RideOn (Montgomery County, MD), Connector (Fairfax County, VA), TheBus (PG County, MD), Howard County MD Transit Services, VanGO (Charles County, MD), and PRTS (Potomac & Rappahannock Transit Services of Prince William County, VA). In addition to the fact that these 10 transit systems physically cover the large geographic area where military staff and patients reside, most of them (except for VanGO) are to some extent connected with at least one of the other bus and/or rail systems.

Just as more NNMCM transit users now ride MetroRail than buses, MetroRail is likely to be the primary WRNMMC transit service in the future since Medical Center station is just across MD355 from NNMCM. Efforts have already been undertaken to plan and fund improved station access. Also on NIH property across MD355 from NNMCM, WMATA operates a pickup and drop off area serving Kiss & Ride commuters, NIH and NNMCM shuttles, and bus stops for both MetroBus and RideOn.

With respect to FBCH, the area adjacent to Ft. Belvoir is served by MetroBus, Connector and PRTS bus systems. The nearest MetroRail and VRE stations are 5 to 7 miles from the base. Expansion of shuttle service and other connections between local transit resources and the base are being considered. [36]

COMPARISON OF TRANSIT RESOURCE LOCATIONS WITH MILITARY MEDICAL STAFF AND PATIENT RESIDENCE LOCATIONS

[Since the service areas of WRNMMC and FBCH are large and overlapping, the choices of military medical staff and patients will affect the actual Bethesda BRAC traffic impact as it evolves over time.]

Figure 2 shows the DC region overlaid with ~45,000 dots, each representing the residence Zip Codes of 10 potential NNMC patients (active, retiree and beneficiary). It is taken from a MD Transit Administration (MTA) report on whether BRAC-related ridership of the proposed Purple Line would be significant. This is why the Purple Line appears as an artifact on subsequent derivative figures.

While MTA's answer to the ridership question (BRAC will have little impact on the Purple Line because it is projected to increase ridership by less than 200/day) may be debatable, this map is the best available picture of the residence locations of some 450,000 DC area residents who have been or could now become NNMC patients. These patients plus a comparable number who have been or could now become WRAMC patients represent most of the future demand on WRNMMC and FBCH medical centers after WRAMC closes.

For scale, 60 mile diameter circles have been centered on both NNMC (future location of WRNMMC) and Ft. Belvoir (future location of FBCH), each indicated by different symbols. Based on the dot density, there appear to be almost as many potential patients (est. 70-80%) within the red FBCH circle as there are within the blue WRNMMC circle. A dashed line indicates the DC boundary, which provides additional scaling since its straight NE edge is 10 miles in length. The large, multi-state region within which DC area military medical staff and patients live reflects traditional, auto-dependent land use planning and residential zoning patterns, the relative affordability of housing, and other life style, career, educational and family choices.

Figure 3 is an enlarged and thus more discernible view of the central area of **Figure 2**. It is the base map for several subsequent figures. The locations of WRAMC, WRNMMC and FBCH are indicated with different symbols. Given that (1) a significant number of current NNMC and WRAMC patients live in the southern portion of the DC area (e.g. south of Route 50) and (2) medical facilities for all military services are being integrated within a single system (aka. Tricare), it is likely that at least some NNMC and WRAMC outpatients (especially those making routine visits or seeking treatment not dependent on a certain specialty or practitioner) could find future trips to FBCH more convenient and/or less time consuming than trips to WRNMMC.

The magnitude of the above-mentioned outpatient shift is likely to decrease if congestion around Ft. Belvoir (planned to receive ~20,000 BRAC- relocated staff) proves as unmanageable during prime outpatient appointment hours (9 am to 3 pm) as many have predicted it will be during peak commute hours (6-9 am and 3-6 pm). [26] Still, one model used for BRAC planning by DoD's Medical Joint Cross Service Group assumed that only 30% of WRAMC's workload would migrate to WRNMMC, while 70% would migrate to FBCH. [21]

A significant relocation of WRAMC and NNMC patients to FBCH differs from the Bethesda BRAC EIS forecast, which conservatively assumes that (a) virtually all WRAMC outpatients will relocate their 500K appointments per year to WRNMMC and (b) NNMC outpatient appointments will continue to number ~500K per year. In short, the actual impact of BRAC on Bethesda's business hour (9 a.m. to 3 p.m.) traffic could well be less than what EIS and derivative analyses have assumed. The extent to which the relocation of WRAMC and NNMC patients to FBCH has been considered in Ft. Belvoir's post-BRAC traffic analyses is not clear, possibly because that impact is small compared to the impact of ~20,000 additional staff.

CHARACTERIZATION OF MILITARY MEDICAL STAFF AND PATIENT RESIDENCE DISTRIBUTIONS WITH RESPECT TO METRORAIL COVERAGE

[The distributions of medical staff and patient residence locations are not the same, yet both populations are at least partially covered by regional MetroRail service, which is expected to be the primary transit resource for WRNMMC staff, outpatients and other visitors.]

Figures 4 and 5 respectively compare the locations of MetroRail lines with (1) the reported distribution of current NNMC staff and patient residences and (2) more limited information on the WRAMC staff residence distribution. The WRAMC staff distribution covers Montgomery County only, since it was used to support a review of BRAC impacts by the MD Nat'l Capital Park & Planning Commission (aka. the Montgomery County Planning Board).

Detail comparable to NNMC's patient residence distribution has not been publicly reported with respect to WRAMC patients. Given the physical proximity (~5 miles) of NNMC and WRAMC however, it is likely that the WRAMC patient distribution is roughly comparable to that shown for NNMC. This statement is supported by the jurisdictional similarity of NNMC and WRAMC staff residence distributions. For NNMC and WRAMC, these distributions are respectively 82% and 80% for MD, 53% and 56% for Montgomery County, 12% and 14% for VA, and 6% for DC. [2]

For comparison purposes, **Figure 6** (from NIH's current main campus master plan) shows the NIH staff residence distribution, which is comparable to both the distribution of NNMC staff (**Figure 4**) and the distribution of WRAMC staff within Montgomery County (**Figure 5**).

Since the historically stable number of NIH outpatient appointments (500 to 600/weekday) is a small fraction (12 to 15%) of future WRNMMC appointments forecast by the Bethesda BRAC EIS (~4000/weekday), the residence distribution of NIH outpatients is not further characterized here. Except for a traditionally significant fraction of out-of-state and foreign patients, the distribution of NIH outpatient residence locations should follow that of the general population, which is discussed further below.

Figures 7 and 8 (from another MTA report [6] about the BRAC effect on Purple line ridership) support the above assumption that WRAMC and NNMC staff residence locations are similarly distributed, except that WRAMC staff residences are shifted to the SE by 5 to 10 miles. This shift is consistent with WRAMC being ~5 miles SE of NNMC. The MTA figures do not reflect as broad a regional perspective as that emphasized in this report. However, since NNMC and WRAMC are only ~5 miles apart, and DoD employees in various service branches can generally afford comparable housing, it's reasonable to assume that the similarity of NNMC and WRAMC staff distributions is consistent throughout the DC region.

The above assumption about similarity of NNMC and WRAMC staff residence locations is supported in **Figure 9** by MTA's 2030 forecast of where WRNMMC staff commuting trips will originate. The 2030 forecast indicates a future staff residence distribution that closely resembles that of current NNMC staff (**Figure 7**). This is not unexpected since the 2500 staff that BRAC will bring to NNMC is only ~30% of NNMC's pre-BRAC population (~8000).

The assumption that both staff and patients of NNMC and WRAMC are similarly distributed is finally supported in **Figure 10** by 2006 Census Bureau update data for the general population [18]. Two main distributions are indicated, both centered on DC. One distribution is oriented on a NE/SW line, while the other is oriented on a SE/NW line. The former is similar to that previously shown (**Figure 3**) on the base map for NNMC patients, while the latter is similar to that previously shown (**Figures 4, 5, and 6**) for NNMC, WRAMC, and NIH main campus staff (all of whom work in or near Bethesda).

Several smaller and more isolated residence concentrations are also apparent in **Figure 10**. Consistent with the general population pattern, these relatively small concentrations would also apply to a relatively small number of military medical staff and patients, so further analysis here is not warranted.

CHARACTERIZATION OF REGIONAL AND LOCAL TRANSIT RESOURCES WITH RESPECT TO MILITARY MEDICAL STAFF AND PATIENT RESIDENCE CONCENTRATIONS

[Military medical staff and patient residence locations are differently distributed.]

Figure 11 highlights and distinguishes the densest concentrations of military medical staff and patient residences. The staff concentrations (red circles) are based on the NNMC, WRAMC and NIH staff

distributions previously shown in **Figures 4 through 9**. The patient concentrations (blue circles) reflect the base map for NNMC patients (**Figure 3**). Except for a SE shift of a few miles (previously indicated by comparing **Figures 7 and 8**), there is no reason for the distribution of WRAMC patients to be significantly different from that of NNMC patients, especially on the regional scale considered here.

With respect to residence location, both staff and patients cluster in certain areas and together exhibit the bi-modal distribution of the general population shown in **Figure 10**. As stated previously, such a pattern is the typical result of auto-dependent land use planning and zoning; socioeconomic factors such as housing affordability and employment opportunities; and individual choices such as family location, educational goals, retirement status, availability of local services, and personal preferences with respect to life style, environment and other factors.

The highest NNMC and WRAMC staff densities occur along an axis running between DC and Frederick (basically along US270). The highest patient densities occur in NE DC and SE Montgomery County (i.e. the area framed by Wheaton, Silver Spring, Olney, Laurel, Langley Park and Takoma Park). In other words, if the base map and its derivatives were overlaid by the face of a clock with noon at the midpoint of the top (north) edge, staff would be concentrated along a line between 11 & 5 o'clock, while patients would be concentrated along a line between 2 & 7 o'clock.

[The Capital Area's three regional rail systems cover most of the areas exhibiting the highest concentrations of military medical staff and patient residences.]

As shown in **Figure 12**, MARC and VRE rail systems traverse 8 of the 9 areas where military medical staff and patient residences are concentrated. In addition, **Figures 4 and 5** previously showed how MetroRail overlays the central 4 areas of concentrated staff and patient residence (i.e. within ~15 miles of DC). Therefore, inadequate rail coverage of where staff and outpatients live must not be the reason for currently low (11% or less) transit use at NNMC and WRAMC. Other factors like convenience, comfort, complexity, habit, time, culture, cost and turnover must be at play.

[Pre-BRAC parking is at capacity at many rail stations, especially MetroRail facilities along the northernmost (Red) and southernmost (Blue) lines most relevant to serving WRNMMC and FBCH.]

Historically low NNMC and WRAMC transit use indicates that extensive rail coverage of Capital Area medical staff and patient residence concentrations does not by itself spur increased transit use. Not all potential transit users can conveniently drive, walk or bike to a station, nor can they all be conveniently dropped off or picked up. In addition, parking at many rail transit facilities was already at capacity before BRAC. For example, MetroRail Park & Ride lots at all Red and Blue Line stations (except Wheaton) are full and have waiting lists for reserved (i.e. commuter or long term) spaces. [27] Compared to the prohibitive expense of additional parking facilities (especially structures), improved pick up and drop off facilities seem a more feasible remedy for limited station parking, which could otherwise become a continuing obstacle to increased use of rail transit. Taking advantage of ~950 currently unused parking spaces at remote Park & Ride lots is a prime reason why state and county planners are now recommending expanded shuttle and/or bus service to those lots as another element of BRAC mitigation. [33]

[Military medical staff members are more likely to use transit on a regular basis than outpatients, PX shoppers and other visitors, but as peak period duration increases, "rush hour" and "business hour" congestion conditions can merge, thus creating impacts that may not have been anticipated.]

Military medical staff and patients are scattered across such a wide area, that significantly different levels of convenience, reliability, comfort, cost, trip duration and complexity would be experienced by different transit users, depending on where their trips originate. It is also reasonable to assume that many if not most outpatients are either physically compromised by or preoccupied with whatever condition led to their medical appointment, and are therefore less likely than staff to use transit, especially if medical appointment and PX shopping trips are combined.

Even though there are far fewer staff members than patients, staff members daily commute the same routes

in the same time window, so it's easier for them to work transit into their travel routine. This and the pre-BRAC existence of AM and PM rush hours is why BRAC transportation studies have focused on staff. However, as indicated by WMATA's forecast of an eventual 80% increase in WRNMMC visitor use of Medical Center station [22], transit can also mitigate Bethesda traffic congestion during prime outpatient appointment hours (9 am to 3 pm).

A continued trend of rush hour periods extending into the business day (**Figure 13**) [32] could significantly hinder future patient access to both WRNMMC and FBCH. Since peak hour periods of nominal duration were assumed in Bethesda BRAC transportation studies, such an impact was not specifically considered or mitigated. **Figure 13** indicates that average rush hour duration for "Very Large" US metropolitan areas (i.e. those with >3 million population, which includes the DC area) now exceeds 7 hours/day and is approaching 8 hours/day (4 hrs a.m. + 4 hrs p.m.).

[One regional and six local bus systems cover most of the WRNMMC and FBCH service area, but complexity, cost and travel time are likely to present continuing obstacles to transit use for the many staff and patients living beyond close, convenient, timely or efficient access to transit.]

Figure 14 and 15 respectively illustrate both regional and county bus service coverage within 30 miles of WRNMMC and FBCH. The regional service in **Figure 14** is MetroBus. The county services in **Figure 15** include the 6 previously identified systems (RideON, Connector, PRTS, Howard County Transit, TheBus, and VanGO).

Rather than overlaying numerous bus routes on the base map (thus making it unreadable), **Figures 14 and 15** indicate that bus services generally cover the area within ~30 miles of DC where most of the military medical staff and patients live. This point is further illustrated by **Figures 16 and 17**, where the locations of concentrated military medical staff and patient residence from **Figure 11** have been overlaid on the regional and county bus service areas.

CHALLENGES TO INCREASED TRANSIT USE

[Multiple modes, routes, physical factors and culture can limit transit use, despite wide area rail and bus coverage by multiple and often interconnected regional and local agencies.]

Rail and bus transit coverage of the WRNMMC and FBCH service area is extensive, and military staff transit use is at least partially reimbursed, but that still leaves convenience, comfort, safety, travel time, reliability and socioeconomic factors as challenges to increased staff use of transit. The same factors plus totally unreimbursed cost would affect transit use by outpatients and other medical facility visitors.

For example, unless a military staff member or outpatient lived on the same rail or bus route as one directly serving WRNMMC or FBCH (and could easily park or be dropped off), inconvenient remote parking and associated arrangements, plus route or mode transfers (e.g. bus to bus, rail to rail, bus to rail, or rail to bus), and additional physical effort, waiting and travel time would be experienced by most potential transit users seeking to get to and from medical facility jobs or appointments. Such complexity, inconvenience and time commitment would tend to limit increased transit use unless some new policy or rules were made and enforced or other options were lacking or worse.

Access, economic and cultural factors can affect transit use as much as distance from transit resources. As previously stated, parking at the most relevant MetroRail stations for NNMC and WRNMMC staff use is already at capacity. With respect to buses, inherent factors include less schedule certainty compared to rail (i.e. more impact of unpredictable highway and traffic conditions); the comfort, weather, lighting, and safety factors of roadside bus stops exposed to the elements, and a perception by some that bus travel has less socioeconomic status associated with it compared to driving, ride sharing or rail travel. In a recent development, budget shortfalls associated with recession are forcing WMATA to consider decreasing MetroBus service by eliminating regional routes where they overlap with local (e.g. county bus service) routes. [34]

The physical, convenience and economic factors are easily understood, but the status issue is more subtle. It was indirectly reflected for example, in both Montgomery County and state rationales for light rail being the preferred mode for the proposed Purple Line between New Carrollton and Bethesda. [28, 29] Status consciousness was also described as an impediment to bus use in more affluent areas by Montgomery County's Planning Director in recent remarks to a DC design conference. [16] Finally, several Montgomery County Council members, when indicating which transportation mode they support for the proposed Corridor Cities Transitway, indicated that their constituents are not likely to use bus service as it is currently positioned in the public mind. [31] In response, MWCOG, MD and Montgomery County have all proposed or are exploring dedicated bus lanes (aka Bus Rapid Transit or BRT) in heavily travelled corridors. BRT enhances the sense of entitlement and permanence associated with buses, as well as their reliability and convenience.

CONCLUSIONS

[The regional bus and rail transit network is extensive, but tripling its use by military medical staff, outpatients and other visitors is likely to remain an unmet challenge for some years beyond full scale start up of BRAC operations in September, 2011.]

With respect to coverage area, the regional and local bus and rail transit systems serving WRNMMC and FBCH staff, outpatients and other visitors are extensive and near enough to where most people live to theoretically handle a large portion (up to 50%) of the associated transportation demand, provided that system access (e.g. parking, drop off, bike racks, etc) posed no obstacles. The issues limiting NNMC and WRAMC transit use to date stem more likely from traditional, vehicle-dependent land use planning (aka. sprawl); relatively easy availability of non-transit options; the transient nature of military tours of duty (i.e. the need for transit culture development to continually be in start up mode); the physical condition and capability of military retirees and beneficiaries; the convenience of transit system access (e.g. bus stops, remote lots, multiple transfers, limited station parking, and limited drop off areas); the reliability, cost, and duration of transit service compared to other options; and individual preferences like habit, comfort, safety, complexity, culture, status and life style.

Up to 2500 additional BRAC staff going to or leaving WRNMMC at a time of day that at least partially overlaps the existing peak traffic periods (nominally 6-9 a.m. and 3-6 p.m.) remains the most significant Bethesda BRAC transportation impact because the existing highway LoS is "E" or "F" (highly congested). Most WRNMMC staff members live along US270 and US15 between US495 and Frederick, an area whose southern half is bisected by the west side of MetroRail's Red Line. If easy drive-alone options, access, reliability, convenience, culture, time and status impediments to increased transit use become moot or countered, a significant number of these staff is likely to eventually use transit, at least on a trial basis. Raising the current, relatively low levels of NNMC and WRAMC transit use from 10% or less to ~30% will probably be a continuing challenge, however. Unless options to increased transit use are absent or less desirable, the goal of 30% staff transit use may not be realized until well after 2011.

[Future success of currently proposed or pending funding increases for Bethesda BRAC highway mitigation projects does not diminish the mitigation importance of significantly increased transit use by military medical staff, outpatients and other visitors.]

Bethesda BRAC traffic combines with existing traffic and continued development along the Wisconsin Avenue, Connecticut Avenue and Old Georgetown Road corridors. The congestion relief potentially provided by proposed highway mitigation projects could thus be short-lived, even if currently promising developments to obtain more federal funding for such projects are ultimately successful. The tendency of enhanced highways to change behavior and fill up again is well known since highway improvements typically attract new and rerouted drivers and can dissuade drivers from trying or seriously considering transit. In short, the increasingly possible funding and delivery of Bethesda BRAC highway mitigation projects does not diminish the eventual need to significantly increase historically low levels of transit use by military medical staff, outpatients and other visitors.]

[The impact of Bethesda BRAC traffic on little-studied business hour (as opposed to commute period) traffic could be significant, but 3 factors could limit that impact: (a) the conservative assumption that all WRAMC outpatients will relocate their appointments to WRNMMC; (b) the closer proximity of many current NMMC outpatients to the new FBCH; and (c) equivalence of WRNMMC and FBCH as world class facilities.]

An estimated 20 to 30% of current NMMC outpatients live in SE Montgomery County, an area bisected by the east side of the Red Line, but for various reasons (physical condition, shopping, inconvenience, habit, etc), very few now use transit. At the same time, additional BRAC staff could exacerbate an existing trend of rush hour extending further into the business day. Such an extension would impact the early and late hours of the prime outpatient appointment period (9 a.m. to 3 p.m.). Prior Bethesda BRAC traffic analyses have not specifically considered this "business hour" impact, but 3 factors appear to counter it:

- (1) Once the BRAC start up and transition period traffic reaches a new equilibrium at both WRNMMC and FBCH, the business hour traffic impacts of up to 2000 additional outpatient appointments per day are likely to be significantly less than the conservative EIS assumption that virtually all current WRAMC outpatients will relocate all of their appointments to WRNMMC;
- (2) Up to 30% of current NMMC outpatients (who together generate NMMC's pre-BRAC level of ~2000 appointments/day) live physically closer to FBCH than to WRNMMC; and
- (3) Since FBCH and WRNMMC are both planned as world class facilities, some current NMMC outpatients may eventually transfer at least some of their appointments to FBCH. In short, the new FBCH could itself provide a significant business hour traffic mitigation for which credit has not previously been taken.

[A peak period civil police presence on Wisconsin Avenue and Jones Bridge Road could provide interim, partial mitigation of some Bethesda BRAC traffic impacts until (a) permanent mitigations such as intersection expansion, Metro station access improvement, and bike/pedestrian infrastructure upgrades can be delivered and (b) transit use by staff, outpatients and other visitors can be increased.]

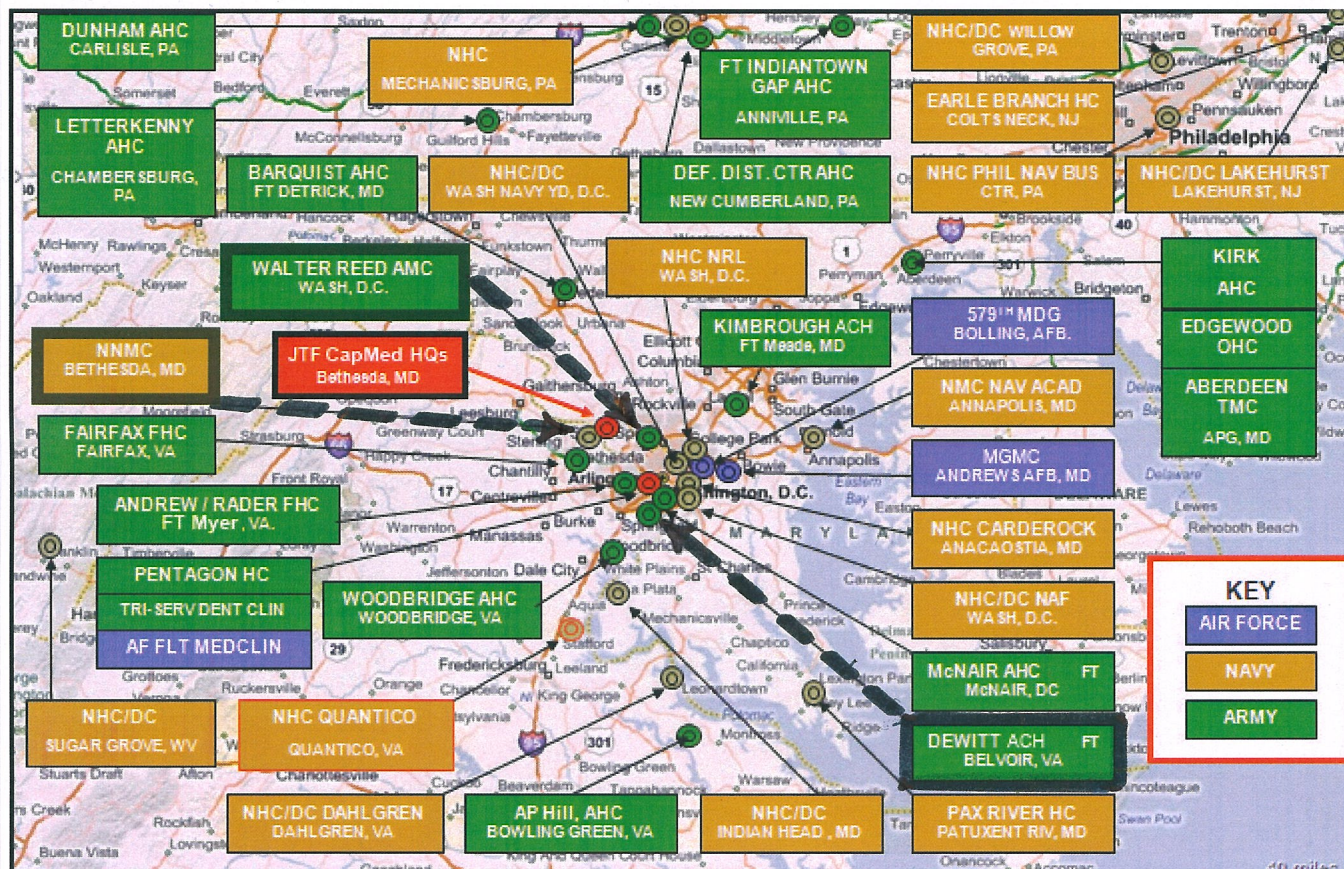
The large number of active duty personnel, retirees and beneficiaries in CapMed's multi-state service area is large enough (est. >900,000), and the BRAC implementation schedule is short enough (< 2 years left until September 2011), that it is likely to take at least a year or two beyond WRAMC closure for traffic mitigation resources, staff commuting patterns, outpatient and visitor travel patterns, and transit resources to adjust to the new distribution of military medical centers. Given Bethesda's existing LoS "E" and "F" (highly congested) highway conditions, new resources, policies, incentives, enforcements, awareness, compromises, pilot projects and experiments will likely be needed before a new and sustainable balance of single occupancy vehicle and transit use develops over time. That is why a civil police presence may be temporarily needed for peak period traffic control and incident response on Wisconsin Avenue and Jones Bridge Road.

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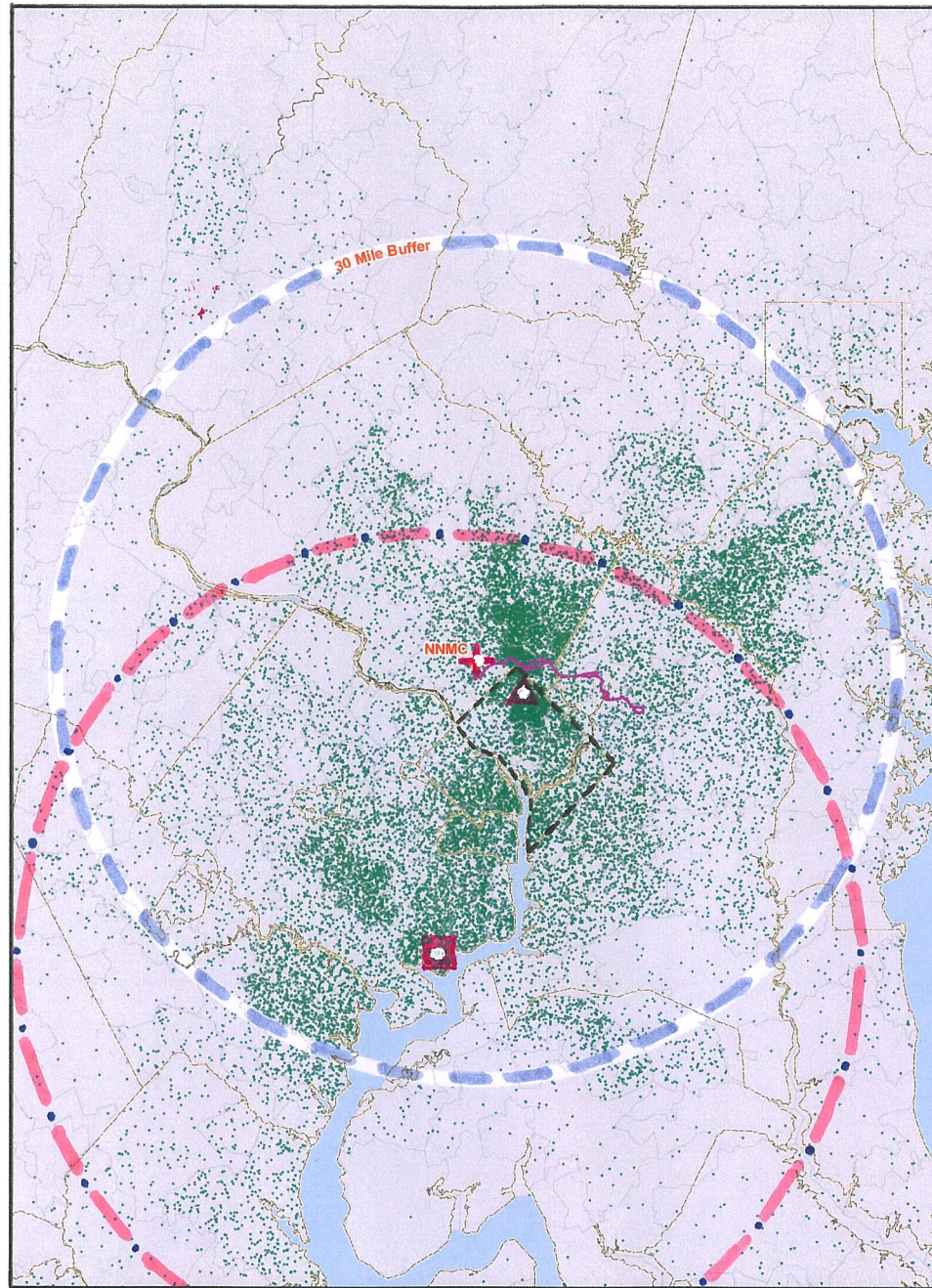
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FIGURE 1: DISTRIBUTION OF THE CAPITAL AREA'S 2 CURRENT AND FUTURE MILITARY MEDICAL CENTERS AND 35 SUPPORTING CLINICS [Ref 30]



Note: Heavy black border indicates a major medical "center";
 DeWitt ACH to be replaced by a major new hospital (FBCH) in Spring 2011;
 Walter Reed AMC to close in September 2011.

FIGURE 2: WIDE DISTRIBUTION OF RESIDENCE LOCATIONS FOR POTENTIAL NNMC PATIENTS
[Ref. 1]











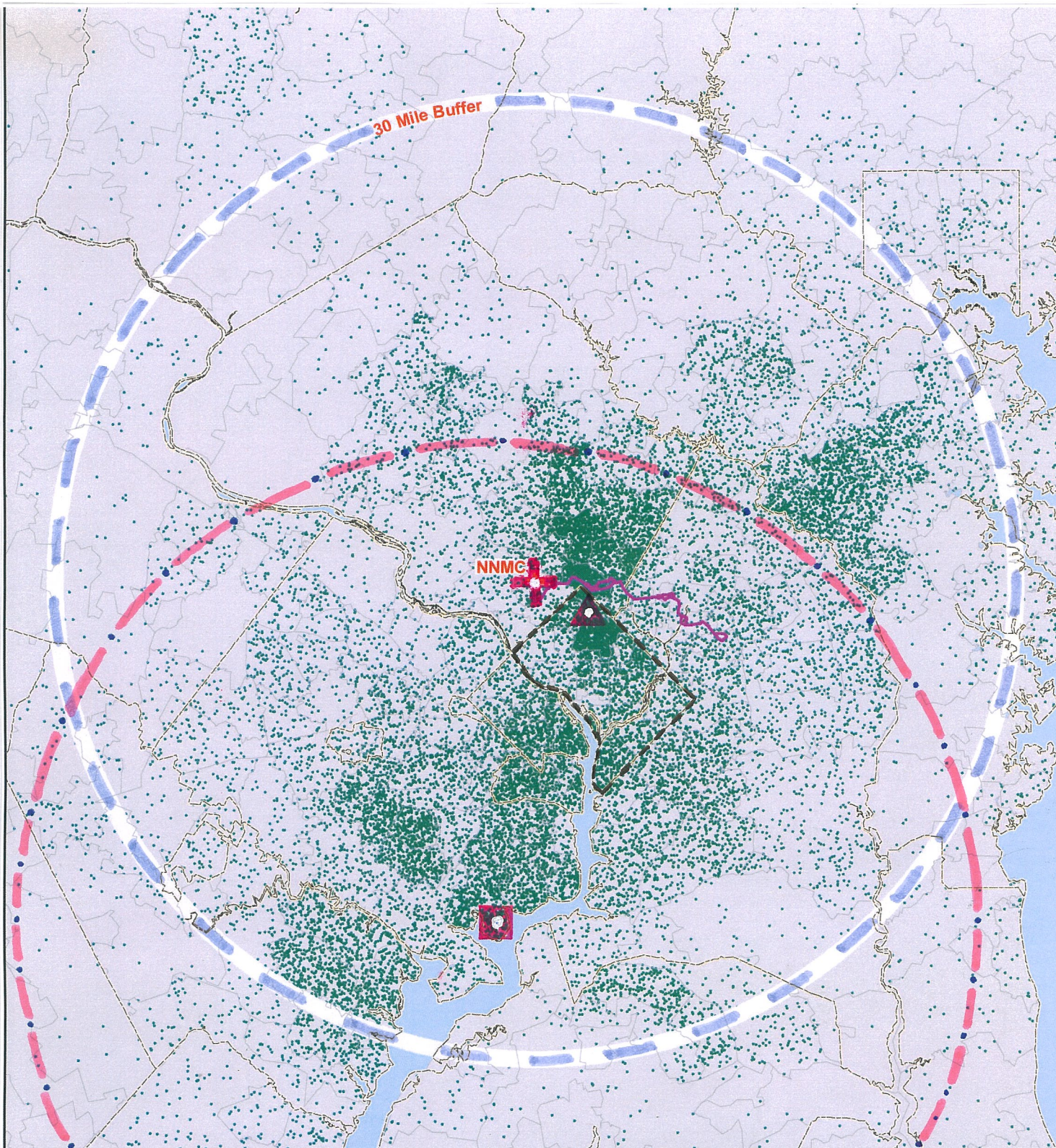
-  NNMC (Nat'l Naval Medical Center)
-  FBCH (Ft. Belvoir Community Hospital)
-  WRAMC (Walter Reed Army Medical Center)
-  Each dot indicates the approximate residence location of 10 current NNMC patients
-  Area within 30 Miles of NNMC
-  Area within 30 Miles of FBCH
-  DC Boundary
-  Proposed Purple Line (artifact of source map)

FIGURE 3:
BASE MAP OF CENTRAL
"CAPMED" SERVICE AREA
 [Ref. 1]











-  NNMC (Nat'l Naval Medical Center)
-  FBCH (Ft. Belvoir Community Hospital)
-  WRAMC (Walter Reed Army Medical Center)
-  Each dot indicates the approximate residence location of 10 current NNMC patients.
-  Area within 30 Miles of NNMC
-  Area within 30 Miles of FBCH
-  DC Boundary
-  Proposed Purple Line (artifact of source map)

FIGURE 4:
COMPARISON OF NNMC
STAFF & PATIENT RES-
IDENCE LOCATIONS W/
METRORAIL LOCATIONS

[Ref. 1 (NNMC patients);
Ref. 2, 3, 16 (NNMC staff);
Ref. 5, 7 (MetroRail)]

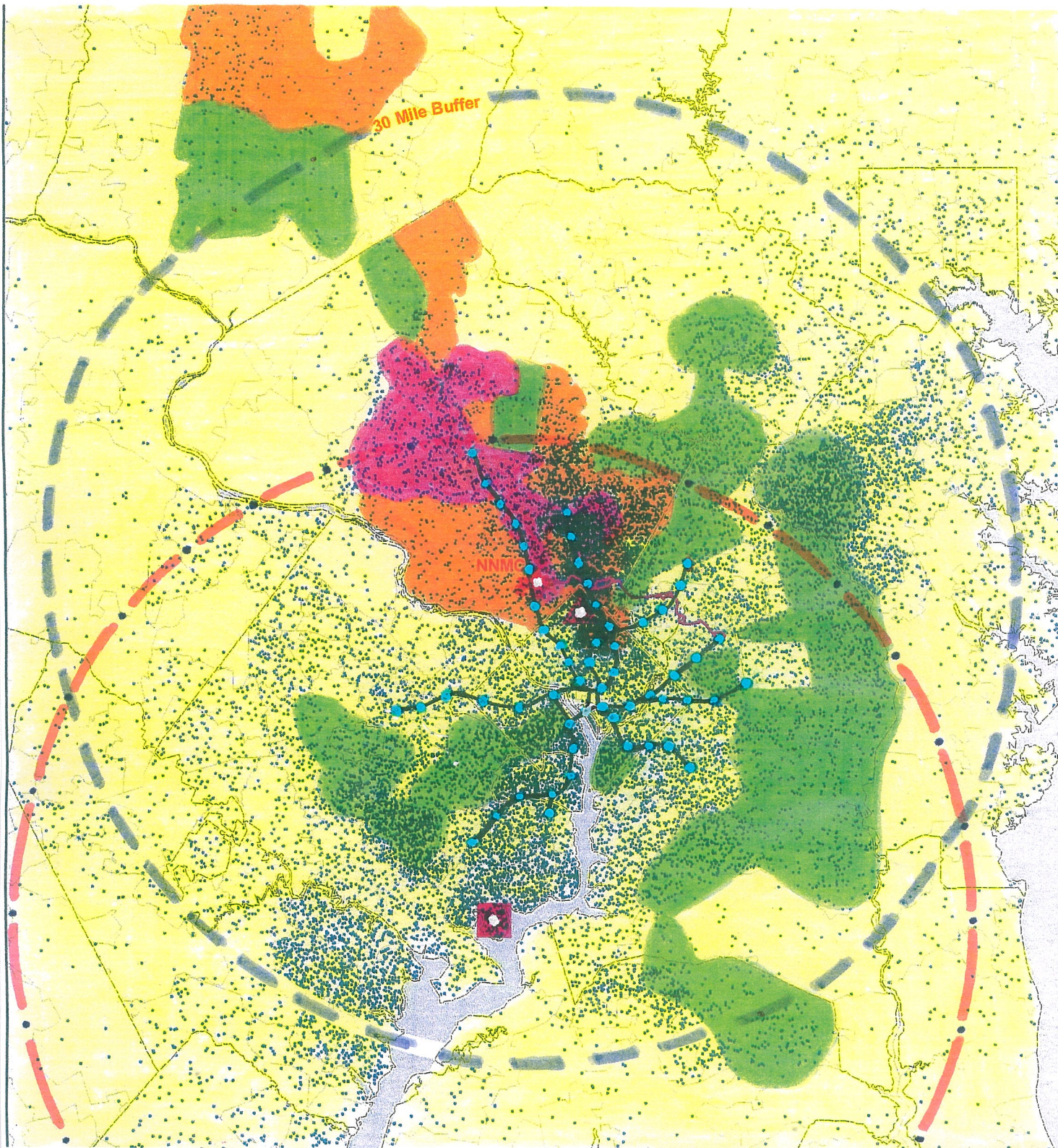
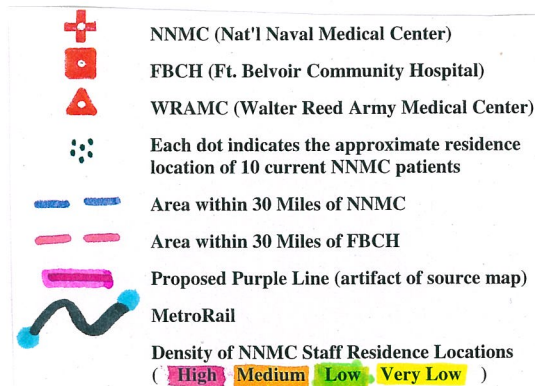
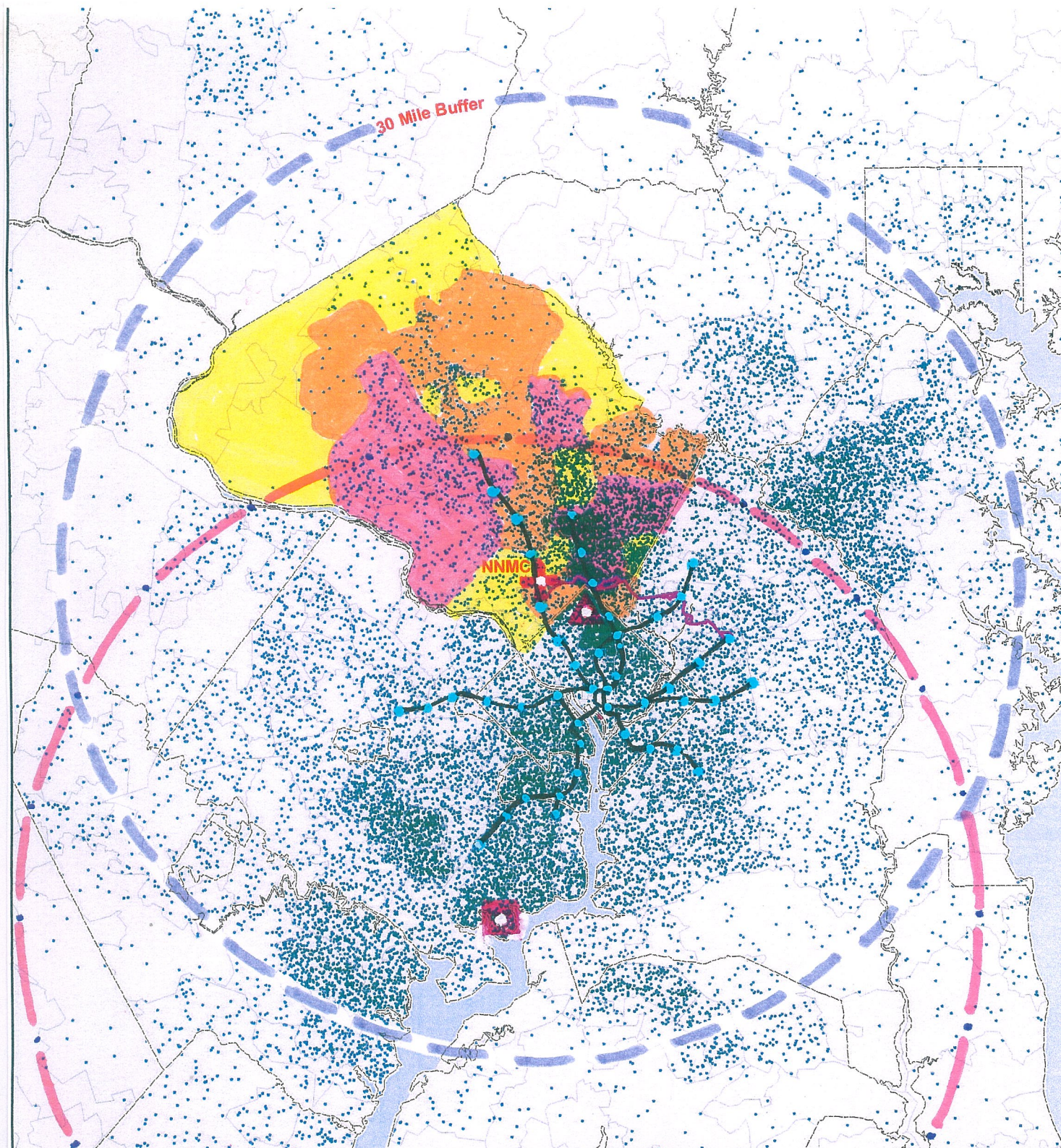


FIGURE 5:
COMPARISON OF WRAMC
STAFF & ASSUMED PATIENT
RESIDENCE LOCATIONS W/
METRORAIL LOCATIONS

[Ref. 1 (NNMC patients);
Ref. 2, 4, 6, 15 (WRAMC staff);
Ref. 5, 7 (MetroRail)]

(Note: only Montgomery County detail is reported for WR staff; no data is reported for WR patients, but given proximity of NNMC & WRAMC, the distribution of NNMC & WRAMC patients will be similar, except for a shift of a few miles to the SE, which is insignificant compared to the wide area distribution of patients)














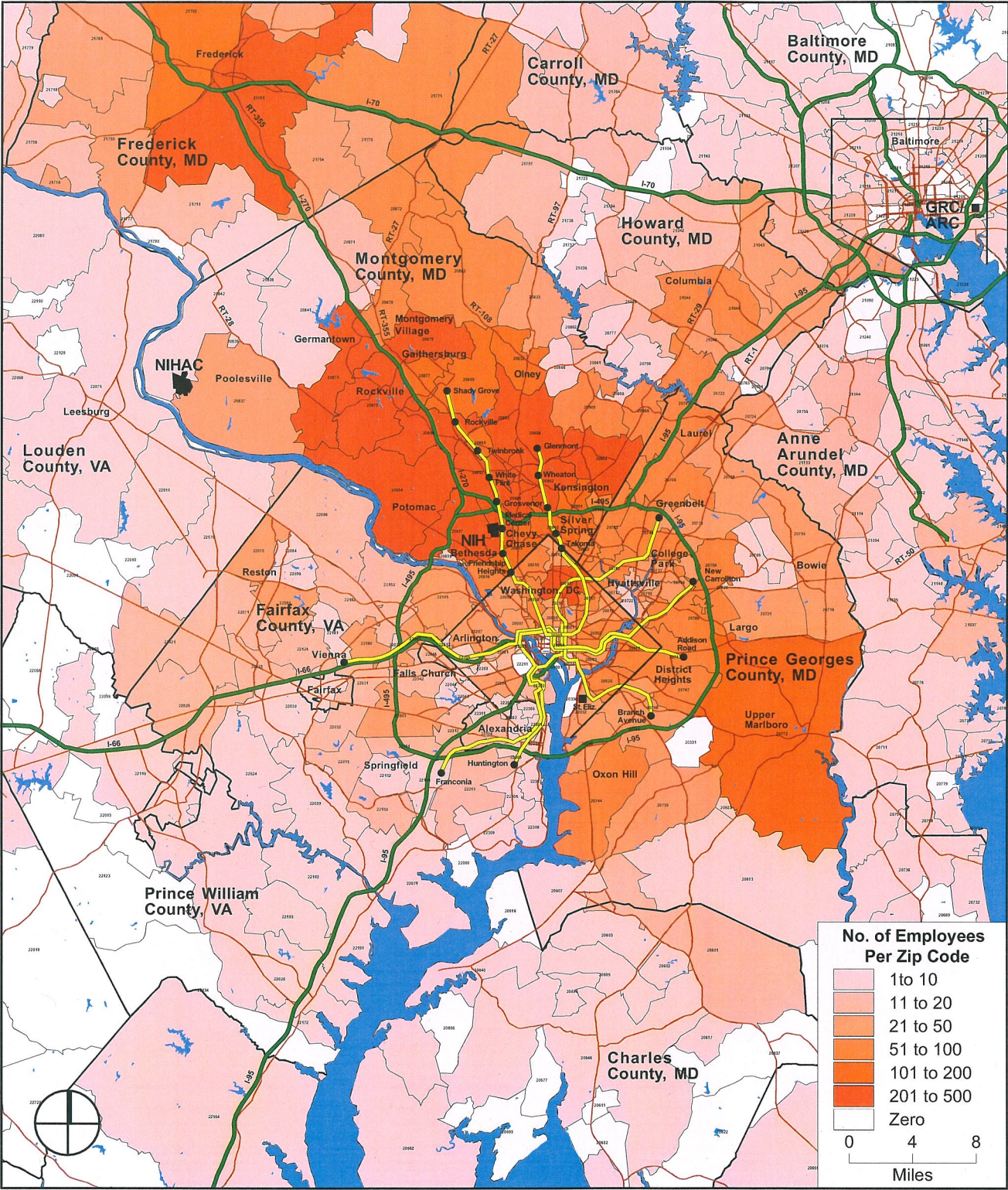
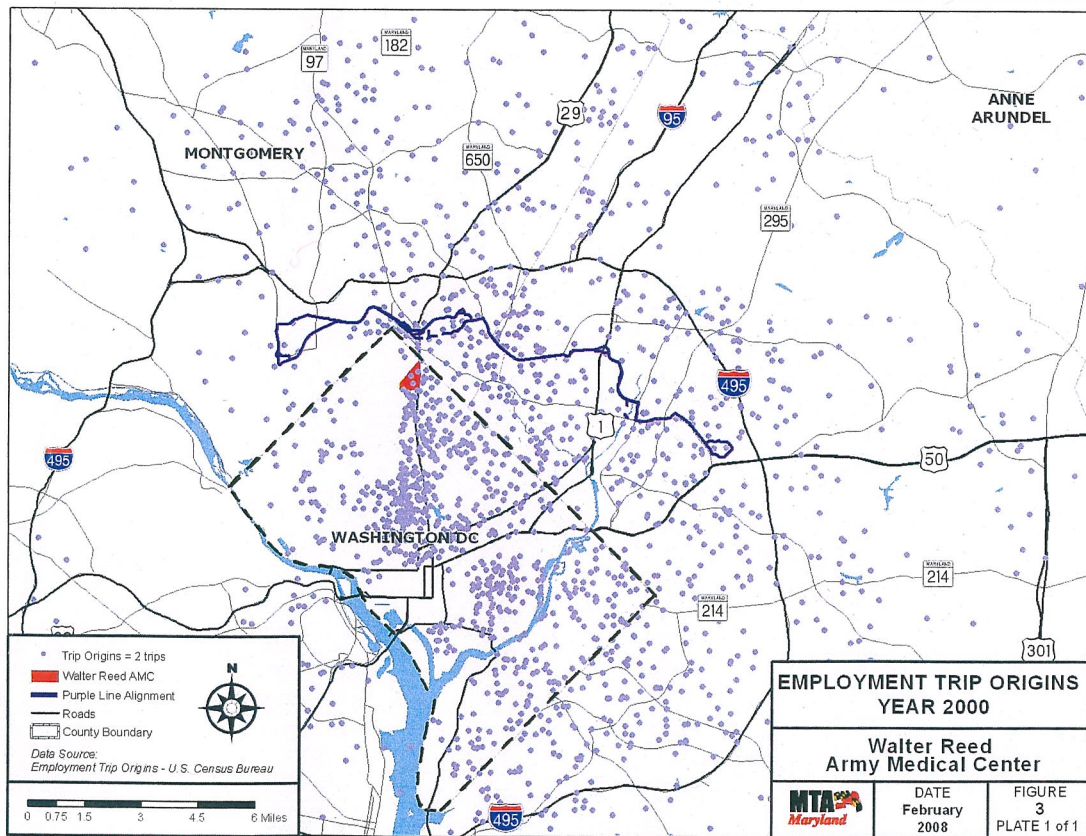
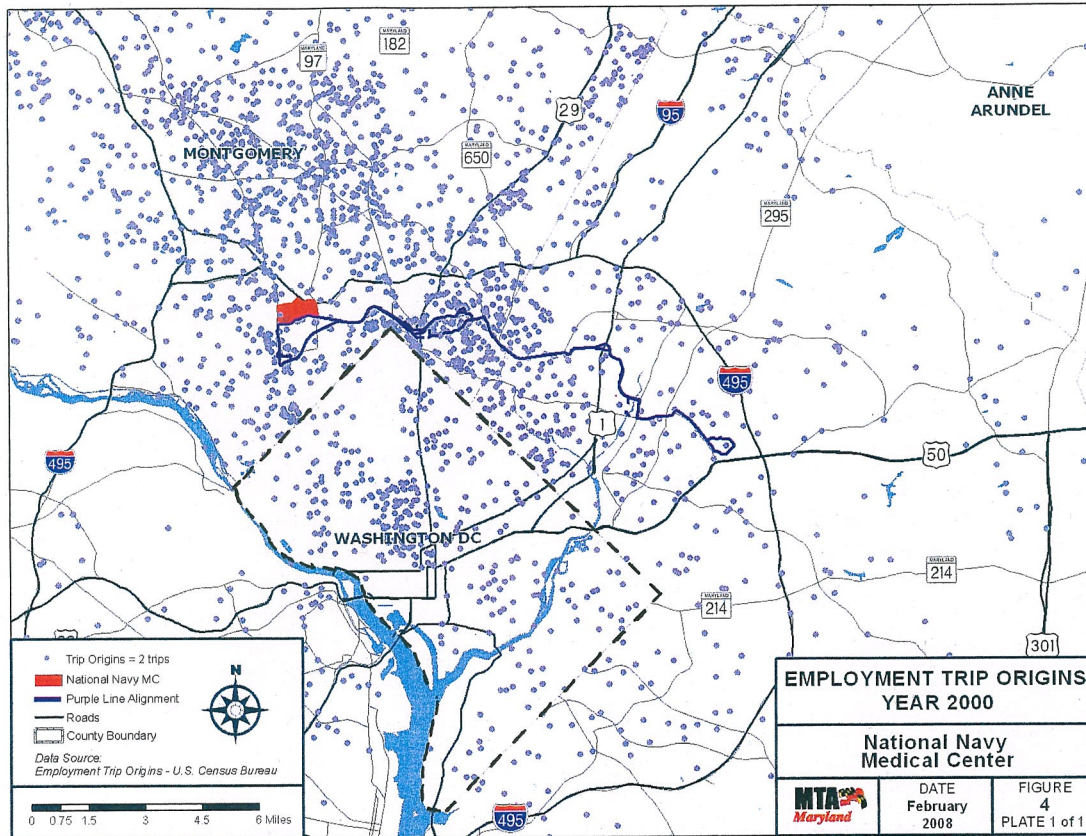
-  NNMC (Nat'l Naval Medical Center)
-  FBCH (Ft. Belvoir Community Hospital)
-  WRAMC (Walter Reed Army Medical Center)
-  Each dot indicates the approximate residence location of 10 current NNMC patients
-  Area within 30 Miles of NNMC
-  Area within 30 Miles of FBCH
-  MetroRail
-  Proposed Purple Line (artifact of source map)
- Density of WRAMC staff residence locations in MoCo
( High  Medium  Low)

FIGURE 6: REGIONAL VIEW OF NIH MAIN CAMPUS STAFF RESIDENCE LOCATIONS
[Ref. 5]



FIGURES 7 & 8: YEAR 2000 COMMUTE TRIP ORIGINS FOR NNMC & WALTER REED STAFF LIVING W/I 10 MILES OF DC [Ref. 6]



**FIGURE 9: YEAR 2030 FORECAST OF COMMUTE TRIP ORIGINS FOR WRNMMC STAFF
LIVING W/I 10 MILES OF DC [Ref. 6]**

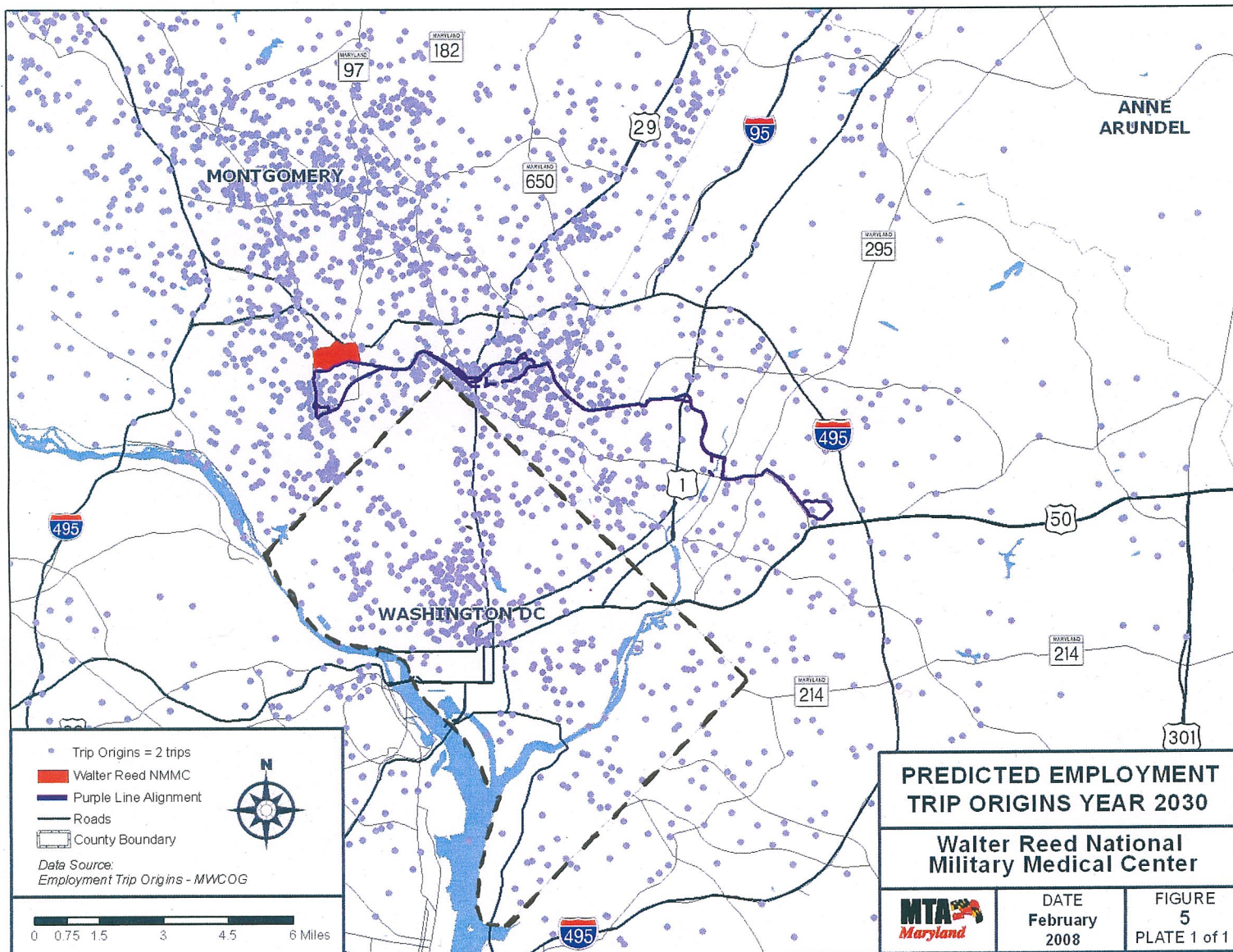
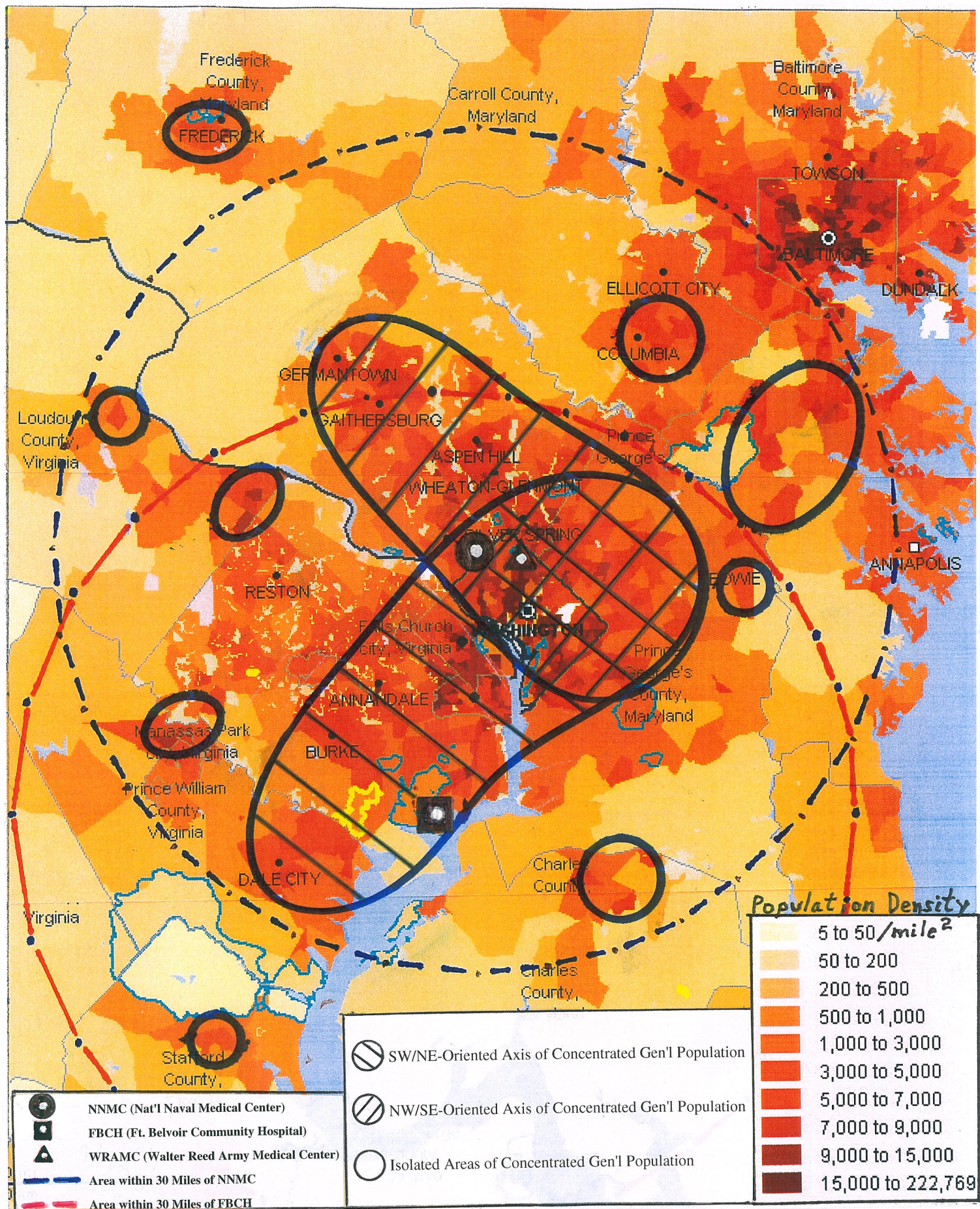


FIGURE 10: 2006 DC AREA POPULATION DENSITY BY CENSUS BUREAU TRACT [Ref. 18]



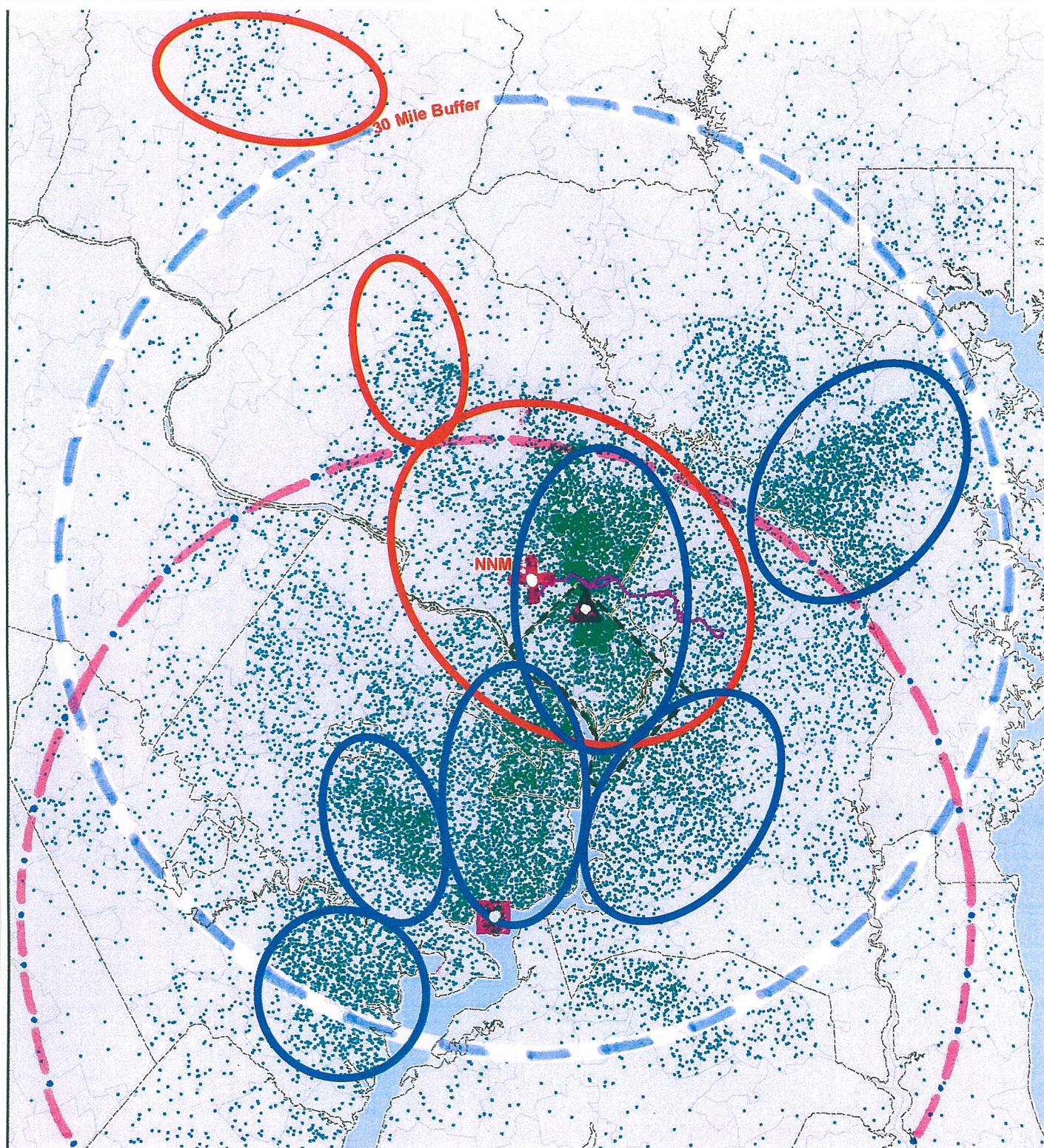


FIGURE 11:
CONCENTRATIONS OF DC
AREA MILITARY MEDICAL
STAFF AND PATIENTS

[Patient (blue) circles from Fig. 3;
Staff (red) circles from Figs 4-9]











-  NNMC (Nat'l Naval Medical Center)
-  FBCH (Ft. Belvoir Community Hospital)
-  WRAMC (Walter Reed Army Medical Center)
-  Each dot indicates the approximate residence location of 10 current NNMC patients
-  Area within 30 Miles of NNMC
-  Area within 30 Miles of FBCH
-  DC Boundary
-  Proposed Purple Line (artifact of source map)
-  Areas of Concentrated Staff Residence
-  Areas of Concentrated Patient Residence

FIGURE 12:
OVERLAY OF MARC & VRE
RAIL NETWORKS ON AREAS
OF HIGHEST MILITARY
MEDICAL STAFF AND
PATIENT CONCENTRATION

[Ref. 8 (MARC), Ref. 9 (VRE)]

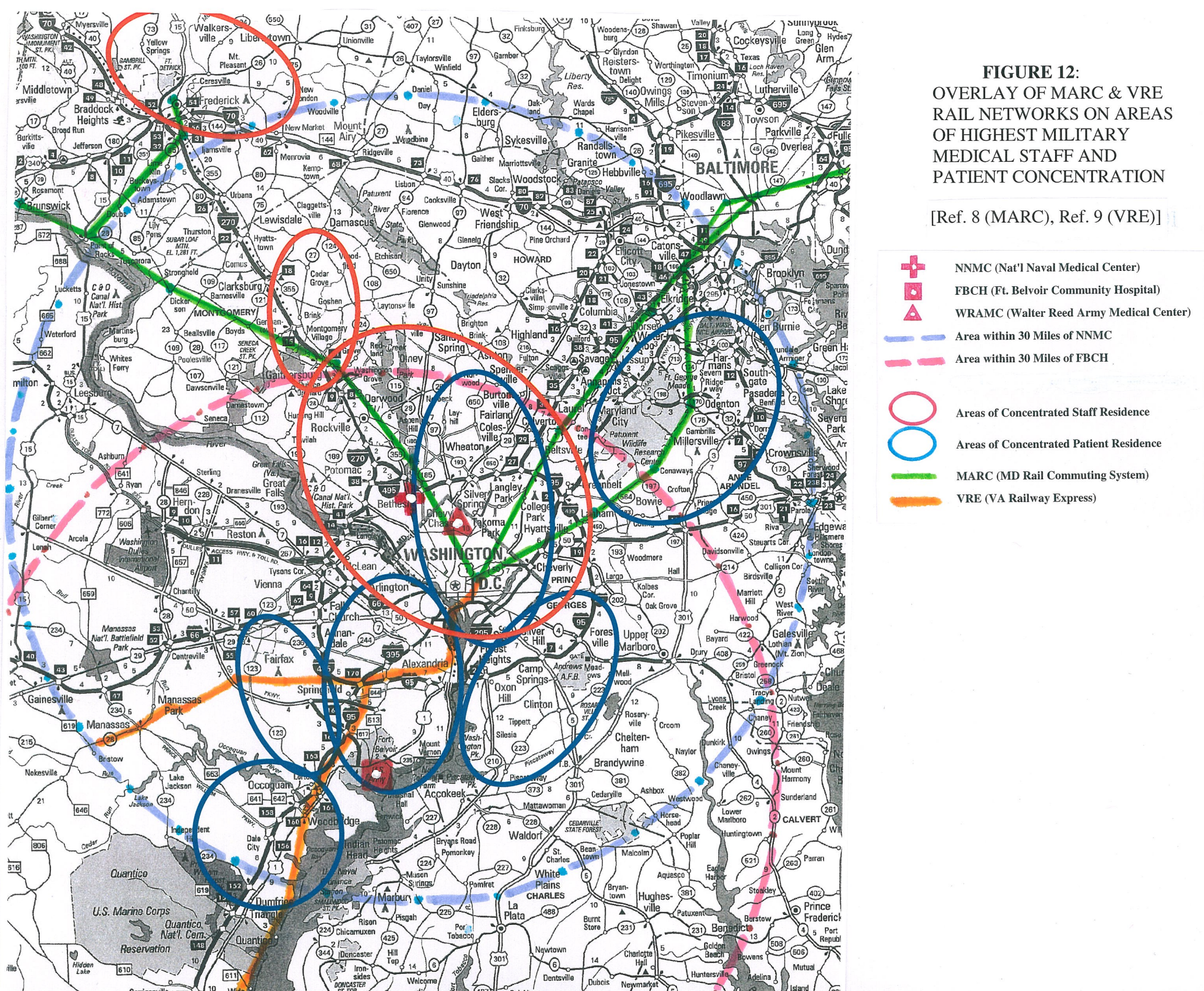
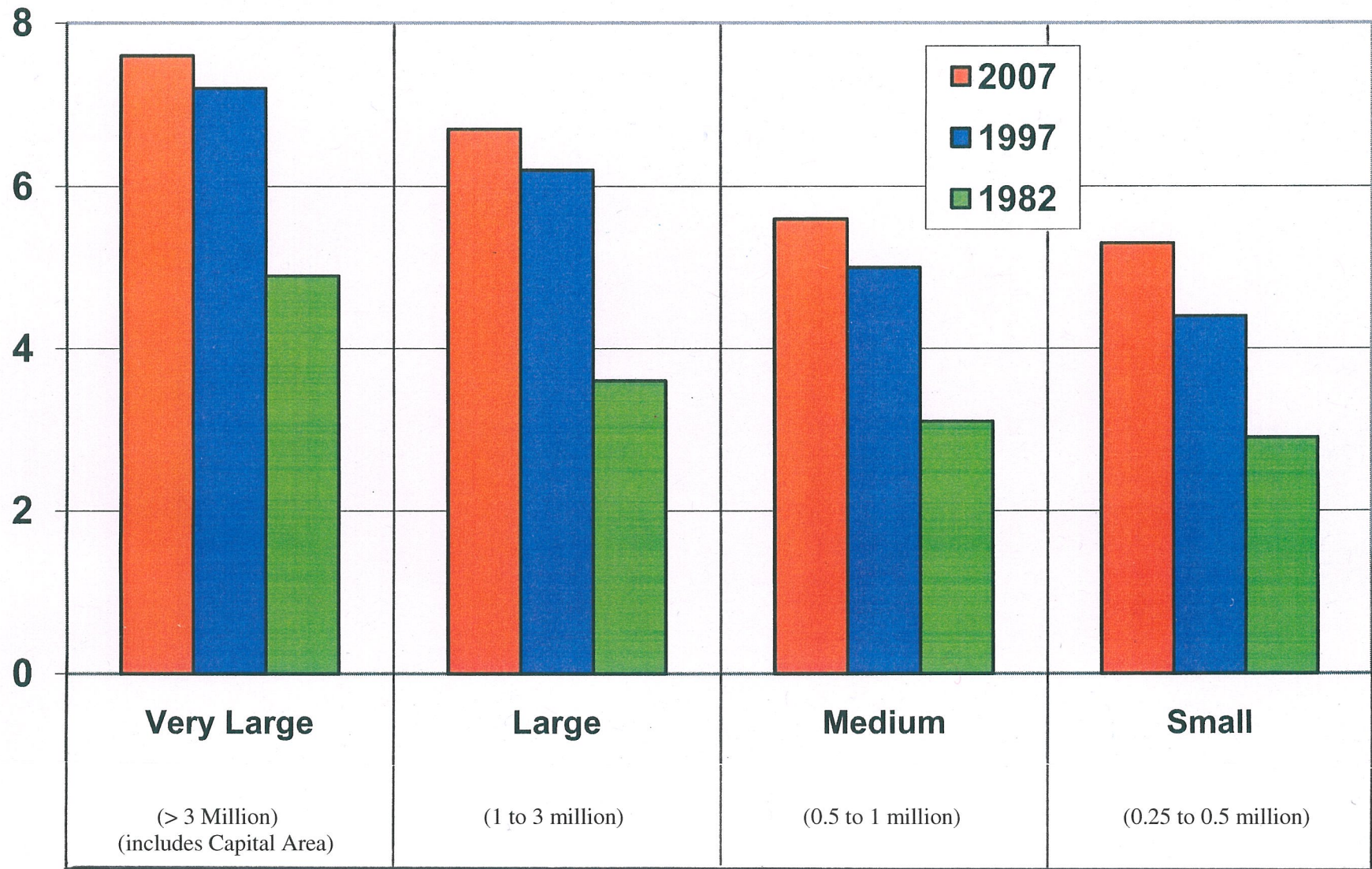


FIGURE 13: LENGTHENING TRAFFIC CONGESTION (aka PEAK) PERIODS FOR DIFFERENT SIZE US METRO AREAS [Ref 32]

Congested Time (hours)



POPULATION

FIGURE 14: METROBUS SERVICE COVERAGE THROUGHOUT THE CAPITAL AREA
[Ref. 10, 11]

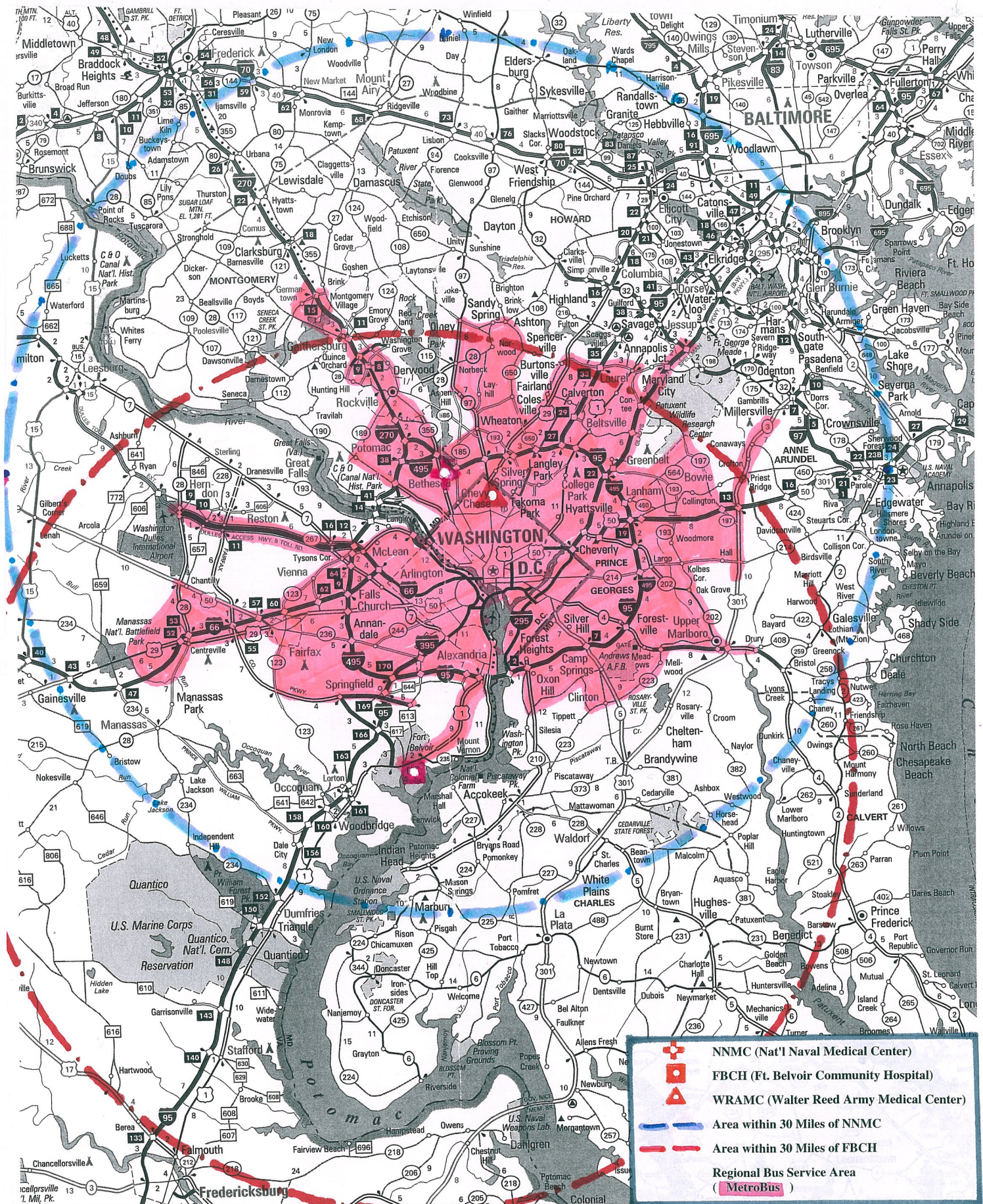
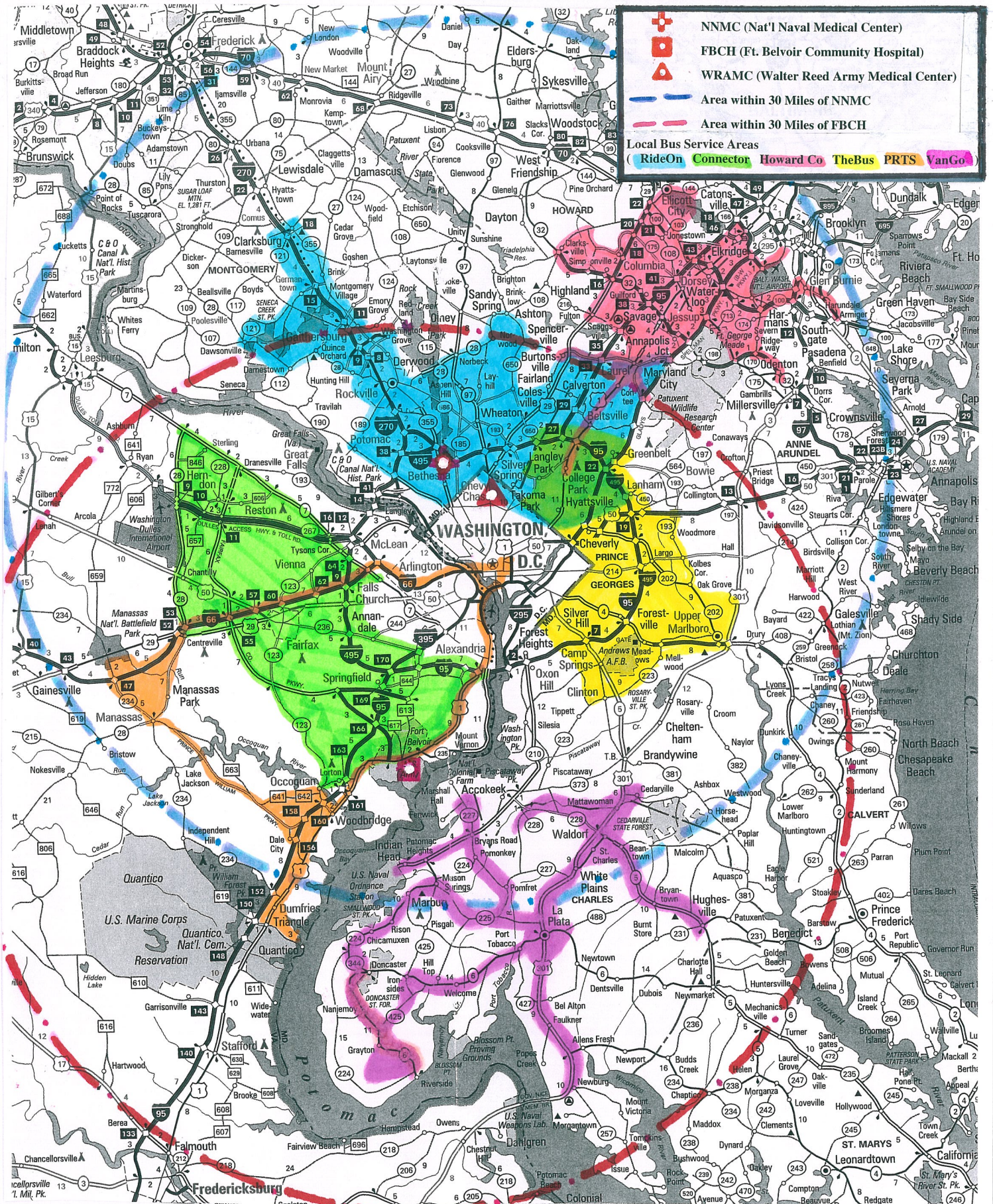


FIGURE 15: LOCAL BUS SERVICE COVERAGE THROUGHOUT THE CAPITAL AREA

[Refs. 12 (MoCo), 13 (Fairfax), 14 (PRTC), 19 (PGC), 20 (Howard), 25 (Charles)]



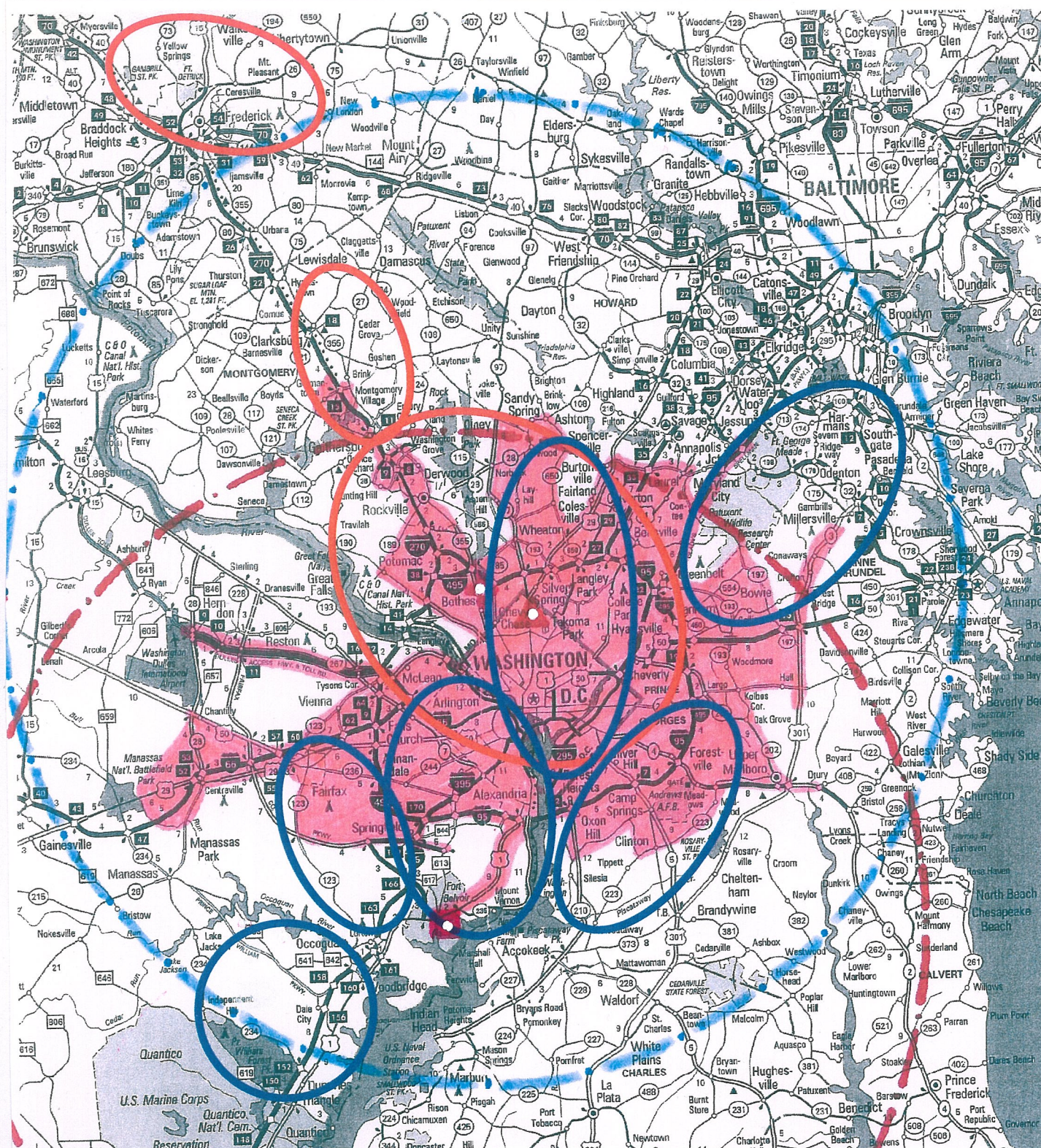












FIGURE 16:
COMPARISON OF METROBUS
COVERAGE OF THE CAPITAL
AREA WITH AREAS OF
CONCENTRATED MILITARY
MEDICAL STAFF & PATIENT
RESIDENCE

[Refs. 10, 11]

- 
-  NNMC (Nat'l Naval Medical Center)
 FBCH (Ft. Belvoir Community Hospital)
 WRAMC (Walter Reed Army Medical Center)
 Area within 30 Miles of NNMC
 Area within 30 Miles of FBCH
 Areas of Concentrated Staff Residence
 Areas of Concentrated Patient Residence
 Regional Bus Service Area
 (MetroBus)

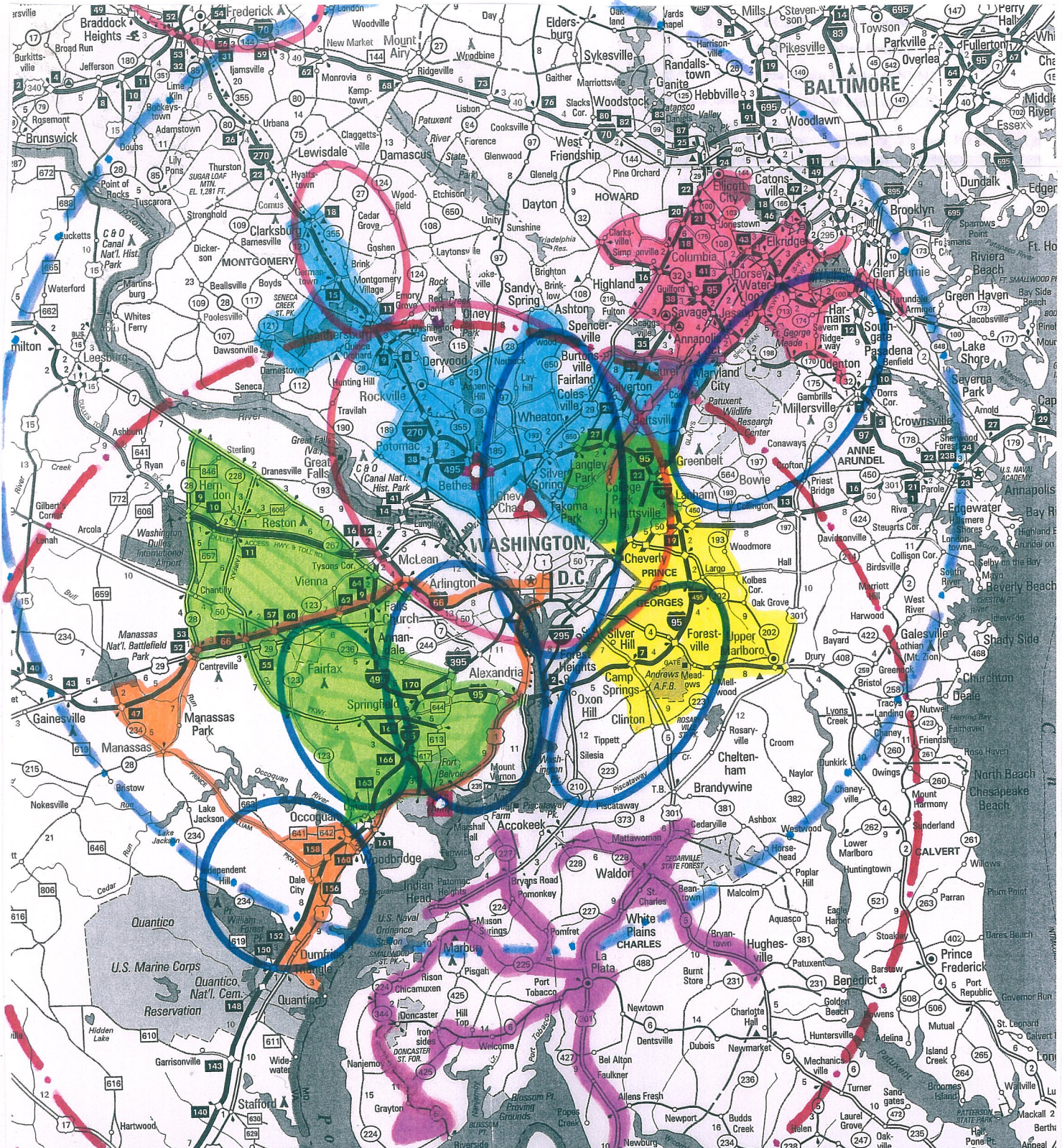















FIGURE 17:
COMPARISON OF LOCAL BUS
COVERAGE OF THE CAPITAL
AREA WITH AREAS OF
CONCENTRATED MILITARY
MEDICAL STAFF & PATIENT
RESIDENCE

[Refs. 12 (Montgomery), 13 (Fairfax),
14 (PRTC), 19 (PGC), 20 (Howard),
25 (Charles)]

-  NNMC (Nat'l Naval Medical Center)
-  FBCH (Ft. Belvoir Community Hospital)
-  WRAMC (Walter Reed Army Medical Center)
-  Area within 30 Miles of NNMC
-  Area within 30 Miles of FBCH
-  Areas of Concentrated Staff Residence
-  Areas of Concentrated Patient Residence
- Local Bus Service Areas**
-  (RideOn
-  Connector
-  Howard Co
-  TheBus
-  PRTS
-  VanGo)